II. Alternatives

US 301 Project Development

Federal Highway Administration

Delaware Department of Transportation

II. ALTERNATIVES

This section describes the alternatives being considered for implementation through the US 301 Project Development process. The process began with prior alternatives evaluated in a 1993 DEIS and a 2000 MIS and continues by including alternatives developed for the current effort. A broad range of alternatives has been evaluated. The alternatives retained for detailed evaluation include the No-Build Alternative and four build alternatives. The four build alternatives have been subjected to detailed evaluation for potential impacts and modifications and refinements to avoid or minimize these impacts. Engineering modifications have been made that provide a more efficient flow of projected traffic. This section concludes with a discussion of the Preferred Alternative.

The No-Build Alternative, programmed improvements and multi-modal elements are presented in Section A. Section B describes the alternatives not carried forward for further consideration, and Section C presents the alternatives retained for detailed evaluation. Section D describes the alignment options considered during the evaluation process. Section E discusses DelDOT's recommended Preferred Alternative.

The evaluation of alternatives began with a review of the Red Alternative, identified in the 1993 DEIS as the Preferred Alternative, and three of the alternatives evaluated in the 2000 MIS. Of these, the three alternatives identified in the 2000 MIS were eliminated from consideration in the Range of Alternatives when they were determined to not meet the current project Purpose and Need with regards to accommodating projected traffic volumes.

Initially, five new alternatives were developed for the current effort; these were identified as the Yellow, Orange, Purple, Brown and Green Alternatives. Following the initial presentation of alternatives at public workshops held in June, 2005, an additional alternative (Blue) was developed. The environmental impacts of these alternatives and the Red Alternative were evaluated by the resource and regulatory agencies, the Project Team and the public to determine the alternatives to be retained for detailed evaluation.

DelDOT recommended the Orange, Blue and Red Alternatives be eliminated from consideration based on evaluations of environmental impacts, meeting project purpose and need, engineering considerations, resource agency consultation and coordination, and public input.

Four build alternatives, Yellow, Purple, Brown and Green, are carried forward for further evaluation based on their ability to meet the project Purpose and Need, feasibility for engineering design, ability to minimize potential environmental impacts, resource and regulatory agency comments and public input. The No-Build Alternative is also included in the evaluation to establish a baseline for comparison. Additional information concerning the assessment of the range of alternatives and the selection of the retained alternatives may be found in *US 301 Project Development: Alternatives Retained for Detailed Evaluation* (Delaware Department of Transportation, November 2005).

A. No-Build Alternative, Programmed Improvements and Multi-Modal Elements

The No-Build Alternative reflects the existing roadway conditions, with only scheduled maintenance and minor roadway and safety improvements. Programmed improvements included in the Delaware Department of Transportation *Capital Transportation Plan FY 2005 – FY 2010* (CTP) are assumed under the No-Build Alternative, but the No-Build would not include any of the impacts associated with the CTP improvements. The build alternatives are compared to the No-Build Alternative with respect to impacts to the natural and built environment.

1. Description of the Existing Roadway

a. US 301, Delaware/Maryland State Line to Chesapeake and Delaware Canal

US 301 enters Delaware from Maryland approximately 8 miles south of the Chesapeake and Delaware (C&D) Canal. A four-lane divided highway in Maryland, US 301 narrows to two lanes before crossing the state line, and continues in Delaware as a two-lane undivided roadway with at-grade intersections through Middletown to Mount Pleasant. In Middletown, SR 71 from Townsend merges with US 301. The roadway alignment in this area is generally north/northeast through Middletown and is approximately parallel to the Norfolk Southern railroad alignment. North of Mount Pleasant, US 301 (Summit Bridge Road) merges with SR 896 and continues as a four-lane divided roadway towards the Summit Bridge crossing of the C&D Canal. South of the C&D Canal, US 301/SR 896 curves to the west for approximately 3,500 feet before making a sharp turn to the north, where the alignment merges with SR 15 (Choptank Road) before crossing the Summit Bridge. The existing intersection of SR 15 and US 301/SR 896 is a signalized intersection located on a 90 degree curve at the base of a steep grade descending from the Summit Bridge. This location has a history of serious accidents that included 54 injuries and 3 fatalities between September 1999 and October 2004. The Summit Bridge was constructed by the United States Army Corps of Engineers (ACOE) in the 1950s and completed in 1960. It originally carried one lane of traffic in each direction across the Canal. Today, the Summit Bridge is striped to accommodate two lanes of traffic in each direction with no shoulders and a concrete median barrier.

b. US 301/SR 896, C&D Canal to I-95

Approximately 6,000 feet north of the C & D Canal, US 301/SR 896 becomes a four-lane divided highway extending north to US 40. SR 896 extends from US 40 to I-95 as a four-lane divided highway. An additional lane in each direction is provided at the SR 896/US 40 intersection to facilitate the flow of traffic through the intersection. The additional lanes end approximately 2,000 feet north and south of US 40. The US 301/SR 896 alignment north of the C&D Canal is generally north to south, with a variable width grassed median and at-grade intersections. SR 71 leaves the roadway before the divided highway begins, and the US 301 designation stops at US 40 while the roadway extends north as SR 896 to I-95.

c. SR 896 (Boyds Corner Road), US 301 to SR 1

Prior to merging with US 301 at Mount Pleasant, SR 896 (Boyds Corner Road) is a two-lane rural road that extends east to Boyds Corner, where it intersects with US 13 and meets SR 1 with a diamond interchange. East of SR 1, Boyds Corner Road continues as Pole Bridge Road to Port Penn on the Delaware River.

2. Programmed Improvements

Programmed improvements in the area are included in DelDOT's currently adopted *Capital Transportation Plan FY 2005 – FY 2010* (CTP). These improvements are scheduled for completion whether or not a build alternative is selected and constructed for the US 301 project. These projects are shown in ***Figure II-1*** and include:

1. US 13, Odessa Transportation Plan Implementation – focus on SR 299 from Memorial Park to the Causeway: safety, streetscaping, pedestrian, bicycle improvements and safe crossing of US 13
2. US 13 and SR 896, Boyds Corner Road and SR 896, Boyds Corner Road and SR 71 Mt. Pleasant Intersection Improvements – conceptual planning to solve traffic congestion problems at both intersections
3. Southern New Castle County Local Road Circulation Plan – recommended intersection, road and operational safety improvements to Mount Pleasant intersection, Armstrong Corner Road/US 301 intersection, US 301, Levels Road, Bunker Hill Road, Choptank Road, Boyds Corner Road (intersection improvements and lane addition), Wiggins Mill Road, Saint Anne's Church Road, Cedar Lane Road, Jamison Corner Road, Route 412A and Lorewood Grove Road; prioritized and phased in consideration of existing deficiencies, emerging development and sewer phasing; includes the infrastructure improvements necessary to support the Westown development
4. SR 15, Choptank Road from Bunker Hill Road to Bethel Church Road – widen the existing roadway from 18 feet to 22 feet with additional five-foot pedestrian and bicycle shoulders, realign some sections, construct three roundabouts at Choptank Road/Bethel Church Road, Choptank Road/Churchtown Road, and Choptank Road/Bunker Hill Road
5. Passenger Rail Study to review the feasibility of providing passenger service on the Norfolk Southern Rail alignment from Wilmington through Middletown to Dover.
6. St. Ann's Railroad Bridge Improvements – Replace the existing St. Ann's Church Road bridge over the Norfolk Southern Railroad just south of Middletown
7. Truck Weight Enforcement – Provide truck weigh and inspection station on northbound US 301 just north of the Maryland state line. A second site is being considered between US 13 and SR 1 for northbound SR 1 traffic and possibly for southbound US 13 truck traffic


301
71
72
9
13
1
DELAWARE CITY
LUMS POND STATE PARK
SUMMIT
CHESAPEAKE AND DELAWARE CANAL
ST. GEORGES
DELAWARE
MARYLAND
TOLL PLAZA
896
MOUNT PLEASANT
15
2
3
4
5
6
7
BOYDS CORNER
ODESSA
299
MIDDLETOWN
TOWNSEND
LEGEND
CTP Projects
X
Improvement Number - see Section B. 2 for description of improvements
Local Roadway Improvements Area
0 1 2 3
SCALE IN MILES
Not to Scale
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
CTP PROGRAMMED IMPROVEMENTS
Delaware Department of Transportation
November 2006
Figure II-1

3. Multi-Modal Improvements

The 2000 MIS looked at a wide range of multi-modal alternatives to consider within the project area, with the goals of reducing the percentage of trips by single occupancy vehicles (SOVs) and increasing the trip share of non-automotive modes of travel. Multi-modal options evaluated included bus and rail transit, high occupancy vehicle lanes, pedestrian and bicycle facilities, Transportation Demand Management Strategies (TDMS), Intelligent Transportation Management Systems (ITMS, or DelTrac) and major and minor roadway improvements. Many of these elements have been implemented and are ongoing, including bus transit service expansion and the construction of park and ride lots, commuter rail studies, the statewide bicycle study, ITMS improvements and local road improvements. Although these measures would help alleviate the growing and projected congestion in the corridor, the MIS also recognized the need for a limited access highway in the corridor.

B. Alternatives Not Carried Forward for Further Consideration

1. Toll Free Facility

All of the retained alternatives are proposed to provide a four-lane, divided, fully access controlled, tolled roadway from the Delaware/Maryland state line to SR 1, south of the C&D Canal. Tolls would be collected at a new mainline toll plaza, located just north of the state line and the planned weigh and inspection station on northbound US 301. Tolls would be collected in both directions at the mainline toll plaza. Tolls would also be collected on all north-serving ramps accessing US 301 (on all ramps entering US 301 traveling northbound and on all ramps exiting US 301 traveling southbound).

Non-tolled options for all of the alternatives were dropped from consideration during the project development process because it was determined that tolls would be necessary to provide funding for the project. Preliminary cost estimates indicate that the total project cost would range between $500 and $750 million for construction.

2. Alignment Alternatives

The Red, Orange and Blue Alternatives were eliminated from further consideration during the evaluation of the range of alternatives based on their inability to meet Purpose and Need, significant environmental impacts, resource and regulatory agency input and concurrence, and public input. The Red, Orange and Blue Alternatives are shown on ***Figure II-2***. Additional information on these alternatives is available in *US 301 Project Development: Alternatives Retained for Detailed Evaluation* (Delaware Department of Transportation, November 2005).

a. Red Alternative

The Red Alternative, under early design measures, provided a new four-lane limited-access roadway on new location on the ridge route from the state line to south of the Summit Bridge.

The Red Alternative modified the existing Summit Bridge to provide 3 lanes for northbound traffic, and constructed a second bridge crossing to the west of the existing bridge to carry three lanes of traffic southbound. North of the Canal, the Red Alternative modified existing SR 896 to provide a six-lane limited-access roadway, with frontage roads for local access, from the Canal to I-95. The Red Alternative was 17.4 miles long, with seven interchanges and ten overpass structures.

The Red Alternative was dropped from further consideration because it provided improvements in the SR 896 corridor (with 35 percent of traffic destinations) as opposed to providing a more direct connection to the northeast and I-95 via the SR 1 corridor (with 65% of traffic destinations). The Red Alternative does not provide direct access to SR 1.

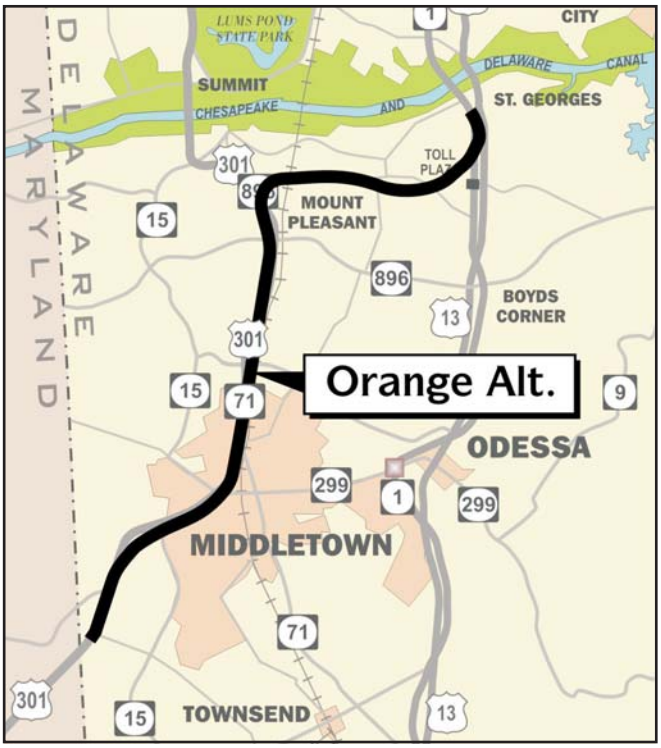
Upon preliminary analysis, the Red Alternative was found to have significant environmental impacts. The Red Alternative had high impacts to waters of the US (32.9 acres of wetlands, streams and ditches), hydric soils (123 acres), floodplains (5.3 acres) and forests (88.9 acres), and had the greatest number of property acquisitions (279) of all of the range of alternatives considered. It had potential and known impacts to historic properties as well as known and unavoidable Section 4(f) impacts (Iron Hill Park, Lums Pond State Park, and the C&D Canal Wildlife Area).

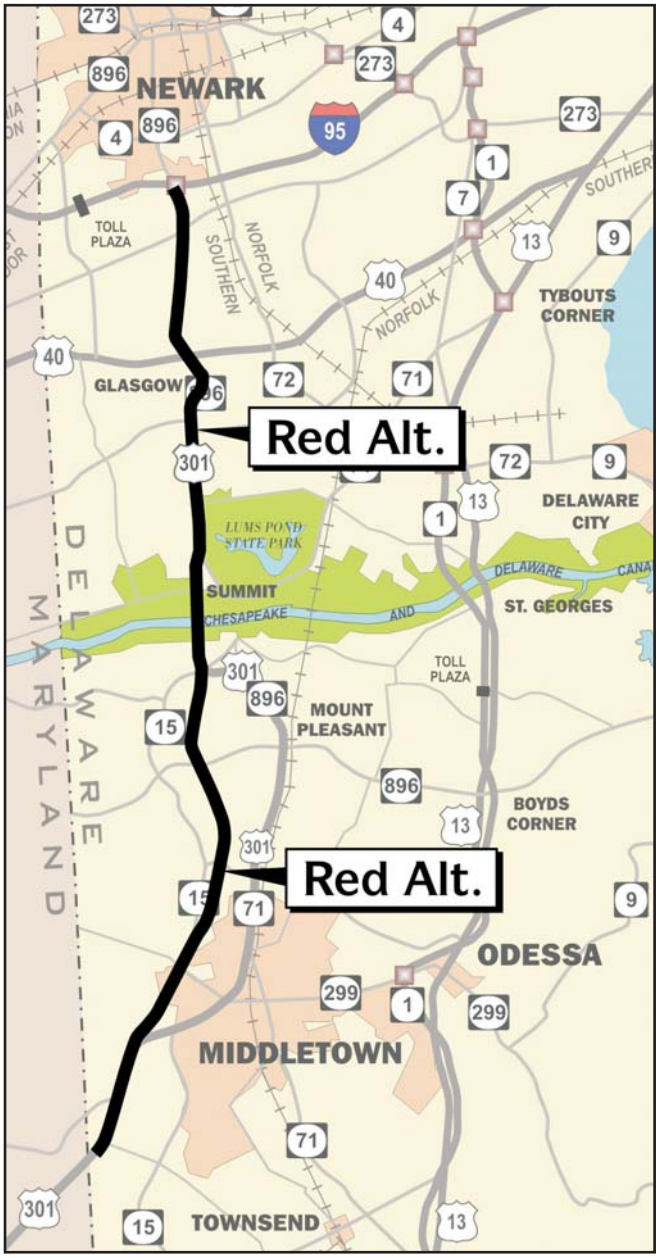
The Red Alternative would also increase traffic volumes on Summit Bridge by over 50%, thus requiring construction of a new bridge over the C&D Canal and a new interchange with US 301/SR 896/I-95, while not taking advantage of the existing infrastructure capacity on SR 1 or programmed capacity improvements in the SR 1 corridor. The Red Alternative was the longest of the proposed alternatives (17.4 miles), required the construction of the most overpasses (10) and interchanges (7) and subsequently had the highest estimated cost ($789 million).

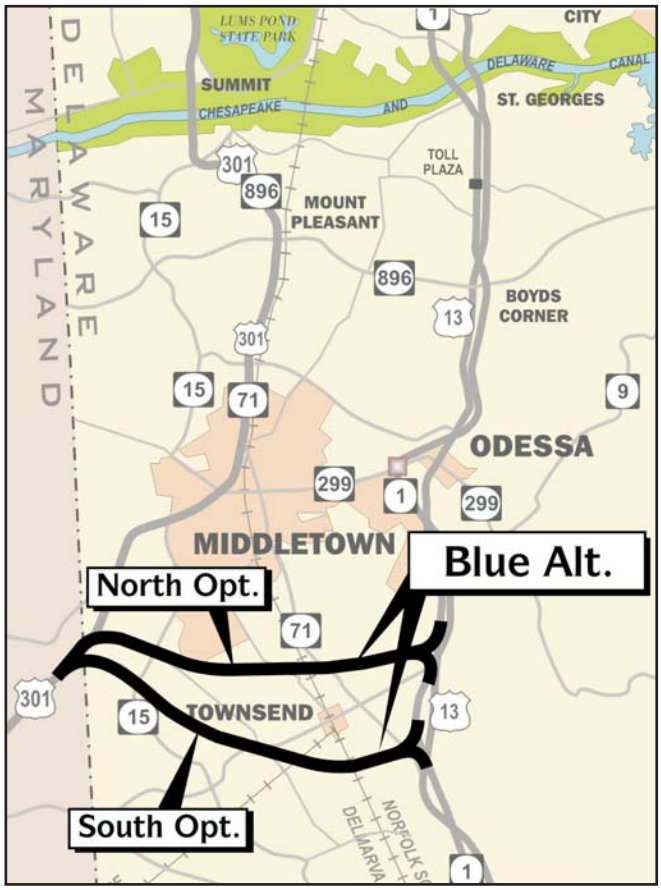
b. Orange Alternative

The Orange Alternative, under early design measures, provided a new four-lane limited-access roadway along the existing alignment of US 301 from the Delaware/Maryland state line to north of Mount Pleasant and on a new location east/west south of the C&D Canal to intersect with SR 1 north of the Biddles Corner Toll Plaza. Frontage roads provided access for properties along existing US 301 and allowed for the circulation of local traffic. The Orange Alternative was 14.2 miles long, and included four interchanges and ten overpass structures associated with roadways and the Norfolk Southern Railroad.

The Orange Alternative was dropped from further consideration because, on preliminary analysis, it was found to have significant disadvantages including various environmental impacts, high estimated cost and a number of community impacts. The Orange Alternative would have the highest impacts to wetlands (47.5 acres) and would impact 1.5 acres of tidal wetlands and 14,438 linear feet of waters of the US.







	US 301 Project Development	
	DRAFT ENVIRONMENTAL IMPACT STATEMENT	
Not to Scale	ALTERNATIVES DROPPED FROM FURTHER CONSIDERATION	
	Delaware Department of Transportation	November 2006	Figure II-2

The Orange Alternative would result in potential and known impacts to four Section 4(f) resources. Of all the considered alternatives, the Orange Alternative would have the highest number of property impacts (300) and also would impact a large number of existing communities within 600 feet of the corridor (including Middletown Village, Springmill, The Legends, Post and Rail Farms, Summit Pond, and Airmont Acres). The new alignment would bisect Middletown, thus separating the community in two and affecting east-west access through town. The Orange Alternative would impact the current operations and future expansion of Summit Airpark and would likely cause issues for emergency services access.

c. Blue Alternative, North and South Options

The Blue Alternative Options, under early design measures, provided a direct east-west connection between US 301 and SR 1 on a new alignment south of Middletown. The North Option alignment was located north of Townsend and the South Option south of Townsend. The Blue Alternative Options were 7.2 and 7.8 miles long, respectively, with two interchanges and six and eight overpasses, respectively.

The Blue Alternative Options were dropped from further consideration because they did not address traffic needs to a satisfactory level; the options did not address traffic congestion, caused in large part by development from Middletown north to the C&D Canal, by building a roadway south of Middletown. The Blue Alternatives Options introduced a highway into an area not planned for significant development.

The Blue Alternative Options would not significantly reduce traffic volumes on Boyds Corner Road, SR 299, existing US 301, or local roads. The Alternatives would not provide local access which would likely result in the roadway being underutilized. Strong environmental resource and regulatory agencies opposition, along with public opposition, was a factor in the decision.

The Blue Alternative would have high environmental impacts and impacts to the area communities. The South Option would have the second highest impacts to wetlands (46.1). The North Option would impact 3.0 acres of (then) proposed state resource conservation areas and 5.8 acres in the Noxontown Pond Natural Area. The Blue Alternative would have significant potential impacts to historic properties. The North Option would have potential Section 4(f) impacts to Wiggins Mill Pond. The Blue Alternative would impact agricultural preservation lands and has a greater potential for impacts to rare, threatened and endangered species than other alternatives; the South Option impacted the most environmentally sensitive area of all the alternatives.

3. Purple and Green Alternatives without Spur Road

The Purple and Green Alternatives, as described in the following sections, both include a 2-lane (one lane in each direction) Spur Road that extends from the Armstrong Corner Road area to Summit Bridge, with an interchange at SR 15/SR 896 south of Summit Bridge. The Purple and Green Alternatives were originally developed without the Spur Road. The Purple and Green

Alternatives without the Spur Road were subsequently dropped because they did not meet traffic or safety needs to a satisfactory level.

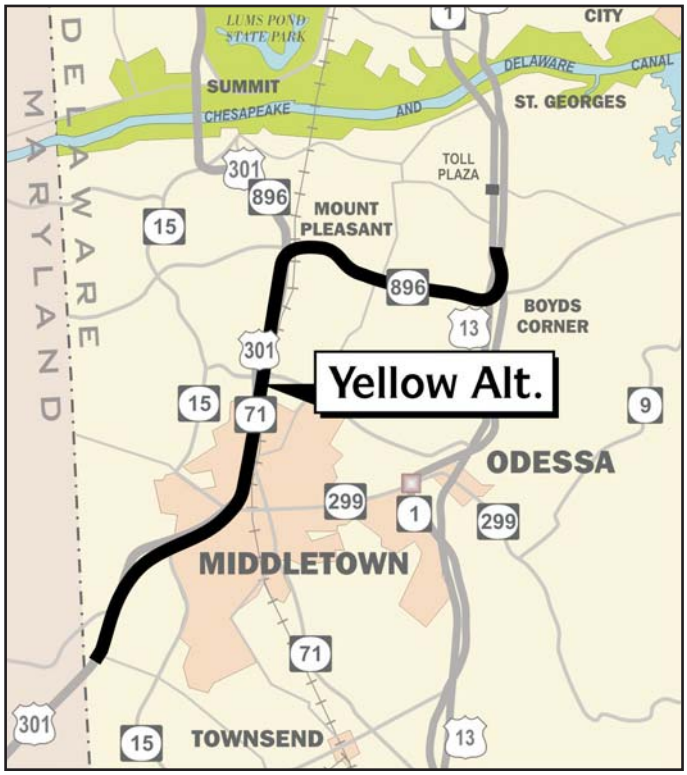
The Spur Road provides a means for motorists traveling to points north of Summit Bridge from south of Middletown, the Eastern Shore of Maryland, and other areas. Currently, 35 percent of all northbound motorists have destinations north of Summit Bridge. Without the Spur Road, this traffic would remain on Choptank Road or existing US 301 to reach destinations north of the C&D Canal via Summit Bridge. The result would be a substantial increase in traffic volumes on these roadways in 2030 that would be three to five times higher than the Purple and Green Alternatives with the Spur Road. For example, without the Spur Road, Choptank Road traffic would increase from the existing levels of 5,000 vehicles per day (vpd) to 15,000 vpd for the Green Alternatives without the Spur Road in 2030. With the Spur Road, traffic volumes would only increase to 6,000 vpd in 2030. Furthermore, traffic on existing US 301 for these alternatives would increase from 23,000 vpd to 37,000 vpd for the Purple and Green Alternatives without the Spur Road.

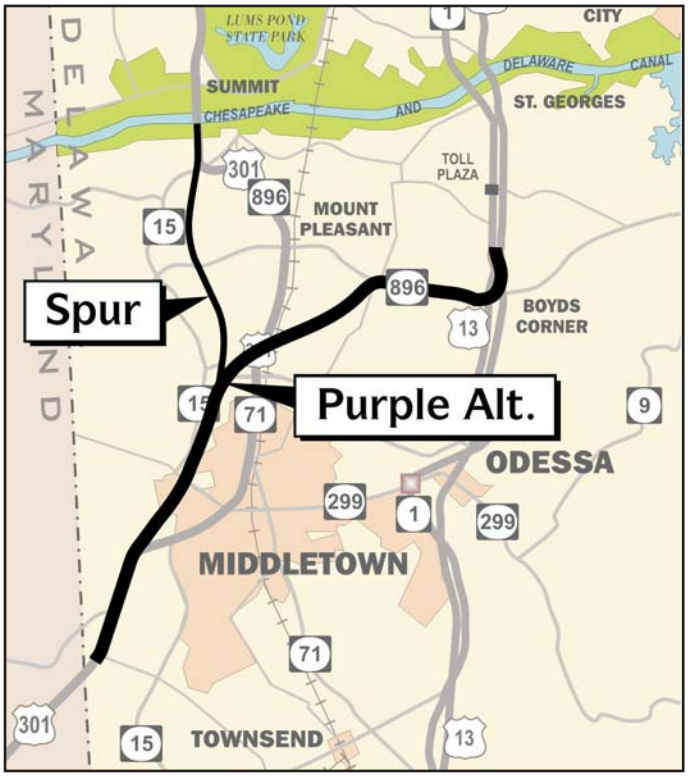
If the Spur Road were not included in the Purple and Green Alternatives, motorists making left turns from residential streets and driveways onto Choptank Road would experience significant delays. The increased traffic would also likely result in a proportional increase in the accident rates along Choptank Road and on existing US 301 (from the Armstrong Corner Road area to Summit Bridge).

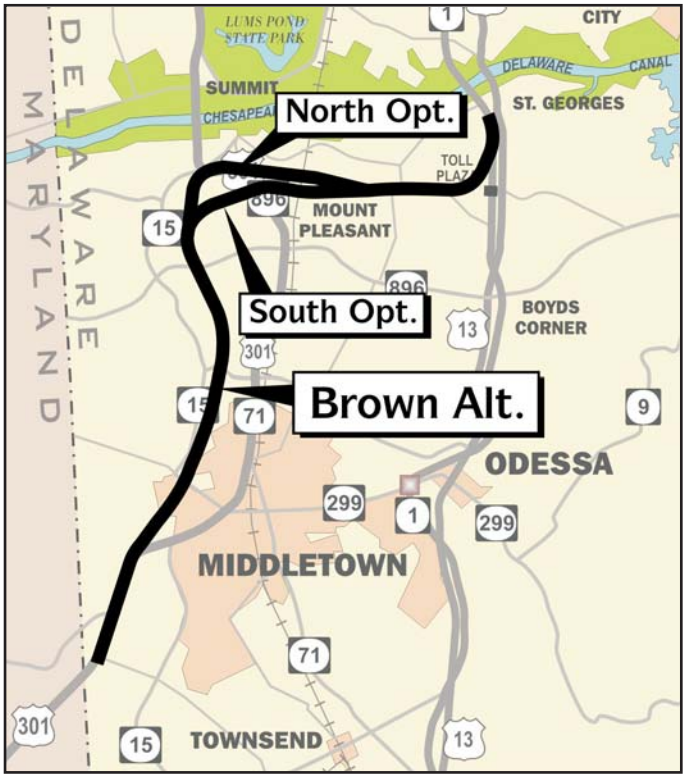
The Spur Road provides roadway capacity that accommodates projected traffic demand for year 2030. The Spur Road removes traffic from rural two-lane roadways and shifts it to a much safer divided two-lane highway and provides for a better opportunity to address the sharp curve south of Summit Bridge. Furthermore, the Spur Road addresses regional connectivity south of the C&D Canal by providing another north-south route that could carry traffic in the event of a closure on SR 1 or US 301.

C. Alternatives Retained for Detailed Evaluation

Four build alternatives are retained for detailed evaluation (***Figure II-3***): Yellow, Purple, Brown (North and South Options) and Green (North and South Options). All of the retained alternatives would provide a four-lane (two lanes in each direction), divided, fully access controlled (denial of access along both sides of roadway except at interchange locations), tolled roadway from the Delaware/ Maryland state line to SR 1, south of the C&D Canal. The Purple and Green Alternatives also provide a two-lane (one lane in each direction), divided, access controlled Spur Road from the Armstrong Corner Road area to an interchange with SR 15/SR 896 south of the Summit Bridge. Each of the Alternatives Retained for Detailed Evaluation is shown on a separate graphic in ***Appendix A*** and described in the following sections. Detailed 1" = 500' scale cut sheets of the alternatives are found in ***Appendix B***.







	US 301 Project Development		
	DRAFT ENVIRONMENTAL IMPACT STATEMENT		
Not to Scale	ALTERNATIVES RETAINED FOR DETAILED EVALUATION		
	Delaware Department of Transportation	November 2006	Figure II-3

All of the build alternatives would include a mainline toll plaza north of the Delaware/Maryland state line prior to any local access points. The collection of tolls is proposed on all north-serving ramps (all on-ramps for vehicles entering the roadway traveling northbound and all off-ramps for vehicles traveling southbound as they exit the roadway).

There are two toll collection options currently under consideration. The first option, traditional tolling, would consist of a mainline toll plaza with highway speed E-ZPass™ toll lanes and cash toll collection lanes (which would also accept E-ZPass™) in each direction. North serving ramps would include highway speed E-ZPass™ and cash toll collection lanes (which would also accept E-ZPass™).

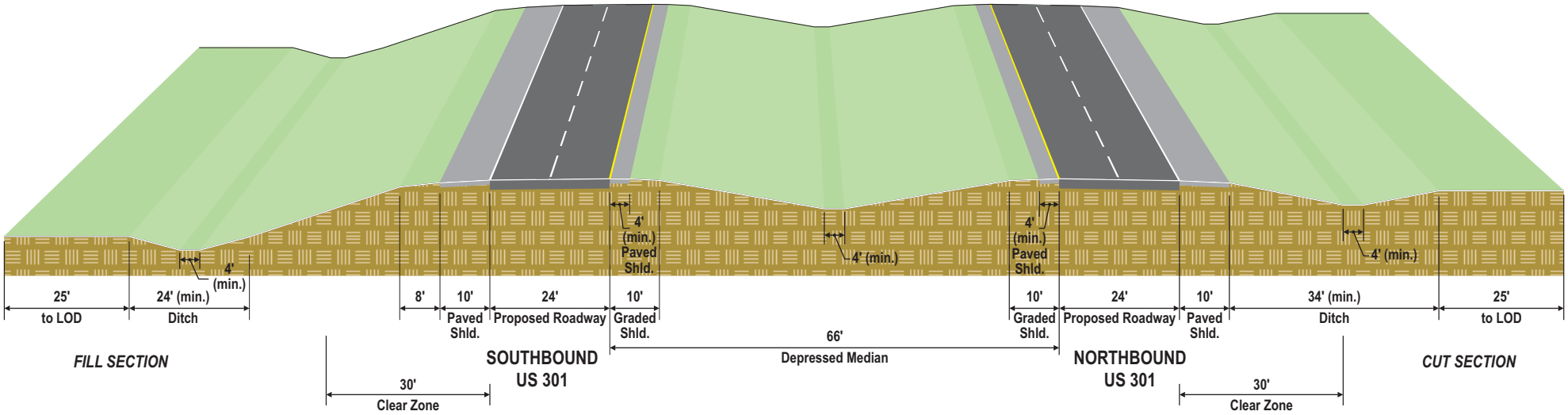
The second toll collection option, Open Road Tolling (ORT), would use overhead gantries with cameras and E-ZPass™ reading equipment. Drivers would not be required to stop under the Open Road Tolling option. The overhead cameras would photograph the license plate of those vehicles not having E-ZPass™ and an invoice would be sent to those non- E-ZPass™ users of the US 301 facility.

The Department is currently evaluating the advantages and disadvantages of each option, including construction and operating costs and effects on toll revenues. The impacts included in this document assume the traditional toll collection option. ORT would reduce the area required for toll collection facilities by replacing toll plazas with overhead gantries, cameras and E-ZPass™ reading equipment.

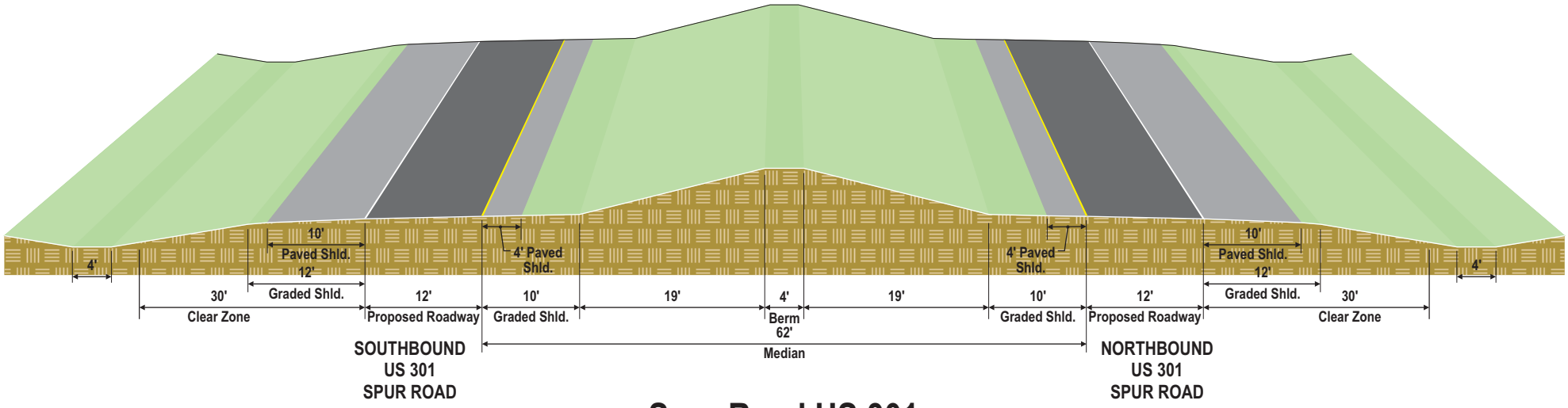
1. General Engineering Design Concepts

a. US 301 Mainline

The typical section for the mainline, for all alternatives, is developed for a 70 mile per hour (MPH) design speed and is shown in ***Figure II-4***. The mainline section would be limited access and include two 12-foot lanes in each direction and a 66-foot median. The outside shoulders would be ten feet wide (all paved), and the inside shoulders would be ten feet wide (four-foot paved and six-foot graded). Beyond the travel lane is a 30-foot wide clear zone, which includes the ten-foot shoulder and 20 feet of grading at a 6:1 slope. The clear zone provides a recovery area for errant vehicles that is free of hazards such as trees, ditches, culverts, etc. The standard side slopes beyond the clear zone range from 4:1 to 2:1 depending on the height of the cut or fill. The proposed right-of-way (ROW) and limit of disturbance (LOD) are set at 25 feet beyond the top of slope to accommodate drainage facilities, erosion and sediment control, and possible construction easements. Visual screening berms are included along the outside shoulders in some sensitive areas and are included in the proposed ROW and LOD. The ROW/LOD line is used throughout this document to estimate environmental and property impacts for the alternatives.



Mainline US 301



Spur Road US 301

US 301 Project Development

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Typical Sections for US 301

Delaware Department of Transportation

November 2006

Figure II-4

b. US 301 Spur Road

The typical section for the US 301 Spur Road, for the Purple and Green Alternatives only, is developed for a 70 MPH design speed and is shown in ***Figure II-4***. The Spur Road would be limited access and include one 12-foot lane in each direction and a 62-foot median. The outside shoulders would be 12 feet wide (all paved), and the inside shoulders would be ten feet wide (four-foot paved and six-foot graded). The clear zone, side slopes, and limit of disturbance proposed for the mainline also apply to the Spur Road. The median could include a visual berm with 4:1 side slopes to provide screening for adjacent properties and a parkway appearance to the roadway.

c. Interchange Ramps

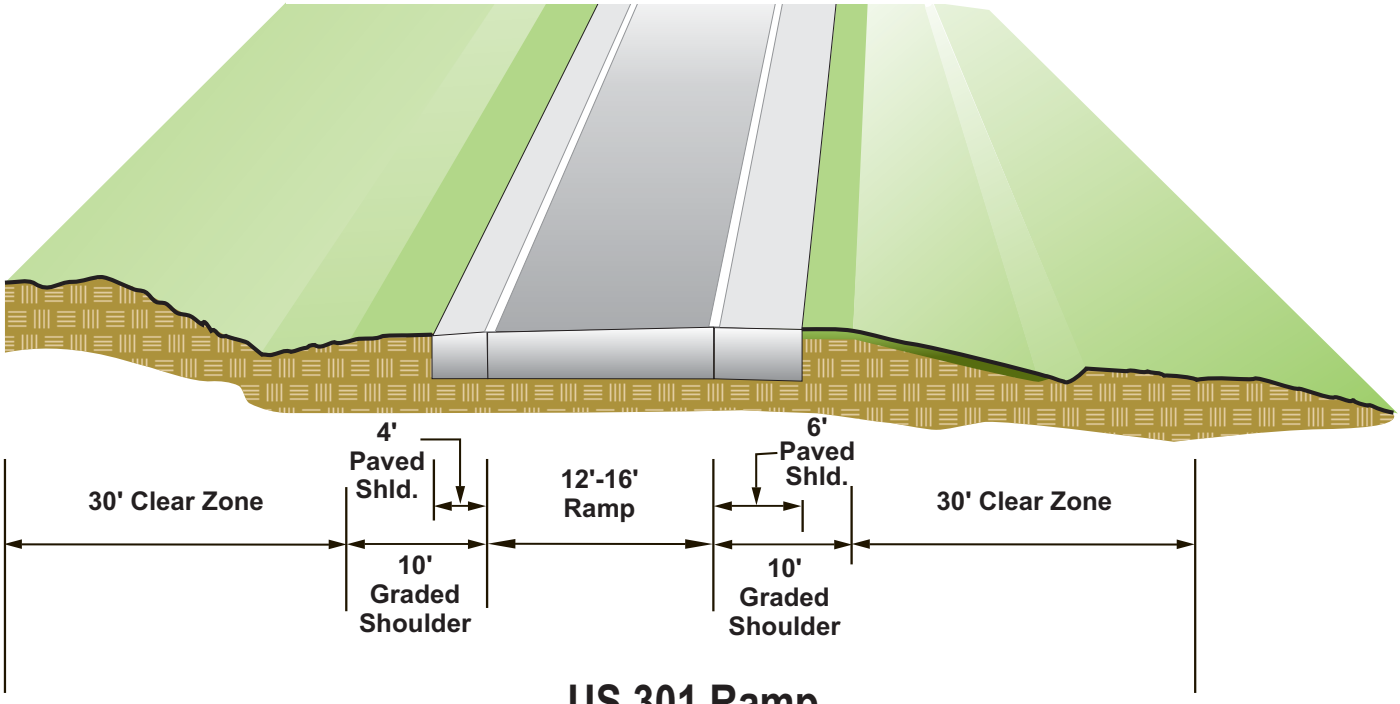
The interchange ramps are developed with design speeds ranging from 35 MPH for loop ramps to 60 MPH for directional ramps. The typical section for the interchange ramps is shown in ***Figure II-5***. Ramps typically include one lane, 16 feet wide on loop ramps and 12 feet wide on directional ramps. The right shoulders would be six feet wide (all paved) on loop ramps and ten feet wide (all paved) on directional ramps, and the left shoulders would be four feet wide (all paved). The clear zone, side slopes, and limit of disturbance proposed for the mainline also apply to the interchange ramps.

d. Local, Collector and Arterial Roads

The local and collector roads are developed with design speeds ranging from 35 MPH to 40 MPH. The typical section for local and collector roads, shown in ***Figure II-6***, consists of two 11-foot lanes and two six-foot wide paved shoulders. A 50 MPH design speed is used for the arterial roads. The typical section for arterial roads, also shown in ***Figure II-6***, consists of two 12-foot lanes and two eight-foot wide paved shoulders. The clear zone, side slopes, and limit of disturbance proposed in the mainline also apply to the local, collector and arterial roads.

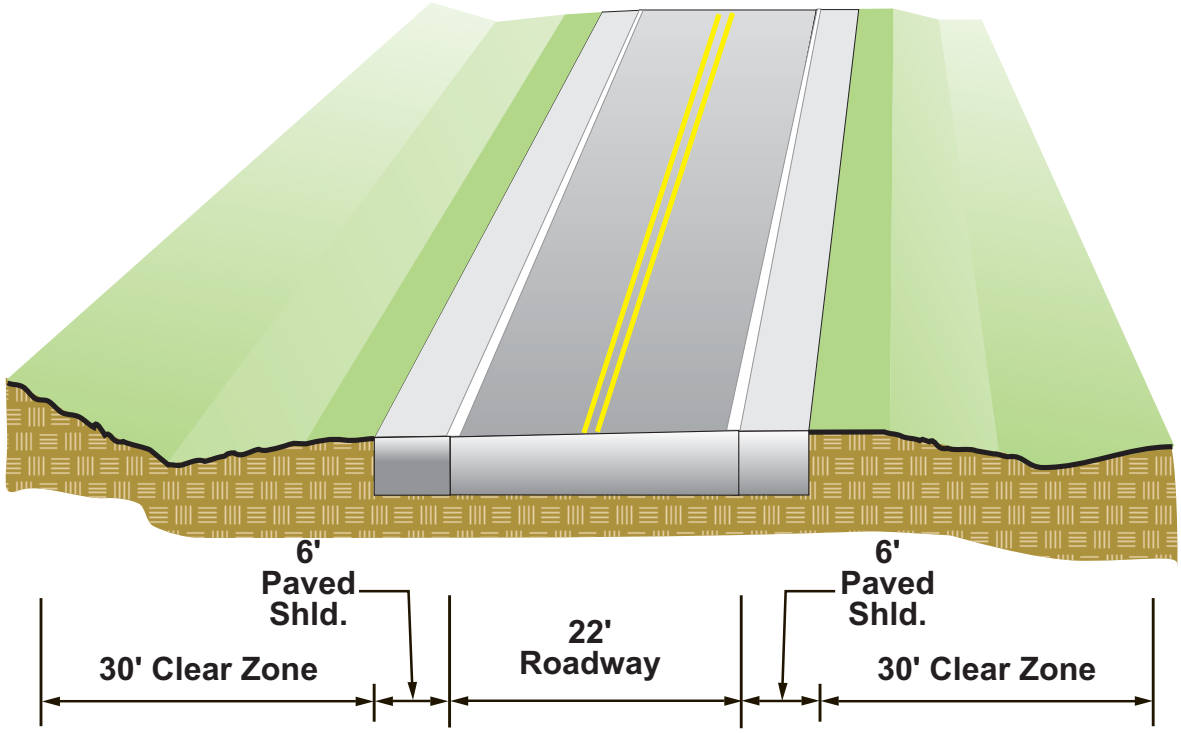
2. Yellow Alternative

The Yellow Alternative would be constructed along the existing north/south alignment of US 301 from the Delaware/Maryland state line to Mount Pleasant, where the alignment would turn east/west and travel along existing SR 896 (Boyds Corner Road) to tie into SR 1, north of the SR 1/Boyds Corner Road interchange. Directional ramps from US 301 would join SR 1 north of the Biddles Corner Toll Plaza.

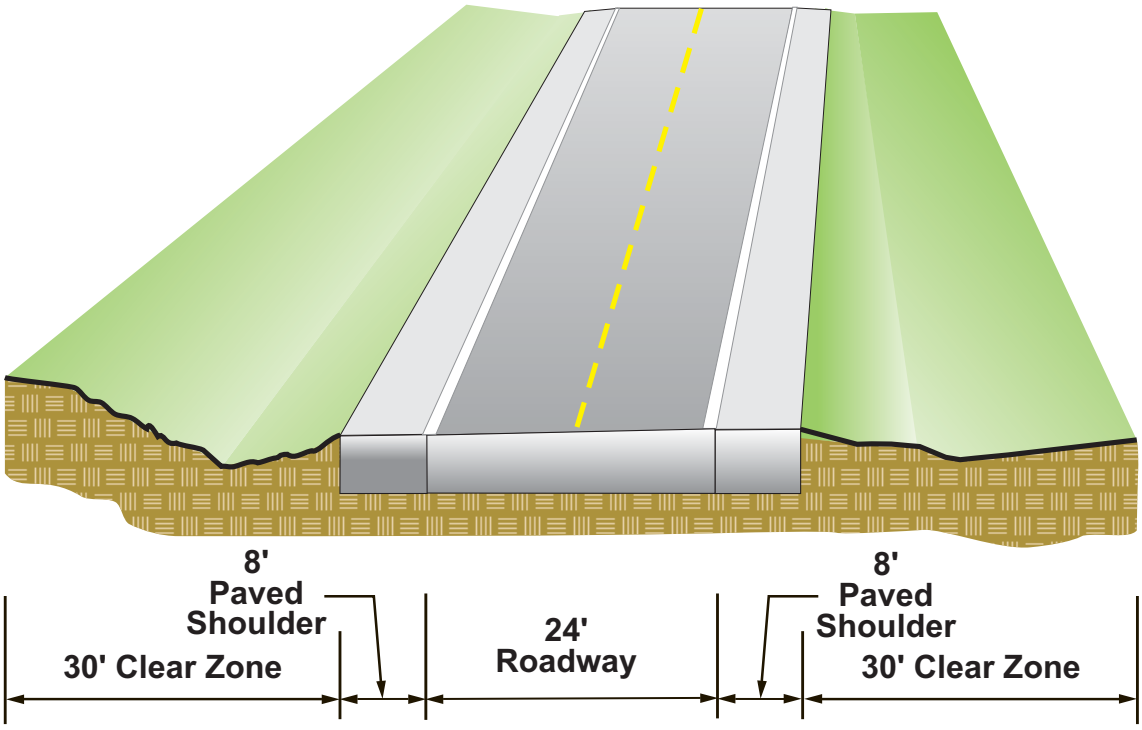


US 301 Ramp

US 301 Project Development		
DRAFT ENVIRONMENTAL IMPACT STATEMENT		
Typical Sections for US 301 Ramps		
Delaware Department of Transportation	November 2006	Figure II-5



Local Road / Collector Road



Arterial Road

The dimensions shown are for the purpose of determining cost estimates and environmental impacts and are subject to change during the final design phase.

US 301 Project Development		
DRAFT ENVIRONMENTAL IMPACT STATEMENT		
Typical Sections for US 301 Local Roads, Collector Roads and Arterial Roads		
Delaware Department of Transportation	November 2006	Figure II-6

The Yellow Alternative measures a total length of 19.4 miles, including frontage roads, and has four interchanges: right-on/right-off ramps southwest of Middletown at Levels Road; slip ramps to service roads north of Middletown; directional ramps to and from SR 1 near Boyds Corner Road; and an interchange at the junction of SR 15/SR 896 at the base of Summit Bridge. The Yellow Alternative is shown in ***Appendix A*** and in detail on ***Yellow Alternative, Sheets 1 through 6 in Appendix B***.

a. State Line to Mount Pleasant

Beginning just west of the Delaware/Maryland state line, the Yellow Alternative would tie into the existing four-lane Maryland portion of US 301 prior to entering Delaware. The new alignment would parallel existing US 301 on the west side, minimizing impacts to a series of historic (listed in the National Register of Historic Places) properties along existing US 301. Arterial frontage roads located parallel to the mainline would provide access for properties along existing US 301 and allow for the circulation of local traffic. From Bunker Hill Road to Mount Pleasant, the Yellow Alternative would overpass SR 299, Bunker Hill Road, Main Street, SR 71, Frogtown Crossing, Armstrong Corner Road, and the Norfolk Southern rail line just south of Mount Pleasant.

b. Boyds Corner Road to SR 1

After crossing over the Norfolk Southern rail line, the Yellow Alternative extends in an east-west direction parallel to SR 896 (Boyds Corner Road). Existing Boyds Corner Road would continue to provide local access. The new US 301 would cross over Jamison Corner Road, Emerson Road, Shallcross Lake Road, US 13 and SR 1 and tie into SR 1, north of the SR 1/Boyds Corner Road interchange and south of the existing Biddles Corner Toll Plaza. Directional ramps from southbound SR 1 to southbound US 301 and from northbound US 301 to northbound SR 1 would bypass the toll plaza.

c. SR 15/SR 896 Interchange

An interchange would replace the existing SR 15/SR 896 intersection at the base of Summit Bridge to address traffic and safety issues.

3. Purple Alternative

The Purple Alternative would be constructed on new location along the ridge route (also called the ridge alignment - generally follows the ridgeline or drainage divide between the Delaware River watershed and the Chesapeake Bay watershed), extending north from the Delaware/Maryland state line to north of Middletown near Armstrong Corner Road, where the alignment would then continue northeast to cross over existing US 301, the Norfolk Southern Railroad, and existing SR 896 (Boyds Corner Road), then extend parallel to existing Boyds Corner Road and tie into SR 1 north of the SR 1/Boyds Corner Road interchange and south of the Biddles Corner Toll Plaza. Near Armstrong Corner Road, where the alignment continues to

the northeast towards Boyds Corner Road, a two-lane, limited access Spur Road would continue north on new location along the ridge route to interchange with SR 15 and SR896, south of Summit Bridge and the C & D Canal.

The Purple Alternative measures a total length of 16.9 miles, including the Spur Road, and has five interchanges: a diamond interchange southwest of Middletown at Levels Road; right-on/right-off ramps at existing US 301 in the vicinity of Armstrong Corner Road; a flyover ramp at the terminus of the Spur Road at the SR 15/SR 896 junction; flyover ramps at SR 1 near SR 896 (Boyds Corner Road); and a partial cloverleaf interchange along the Spur Road at an extended Bethel Church Road. The Purple Alternative is shown in ***Appendix A*** and in detail on ***Purple Alternative, Sheets 1 through 8 in Appendix B***.

a. State Line to Armstrong Corner Road Area

Beginning just west of the Delaware/Maryland state line, the Purple Alternative would tie into the existing four-lane Maryland portion of US 301 prior to entering Delaware. Continuing north, the alignment would be located on new location on the ridge route between existing US 301 and Choptank Road. The Purple Alternative would shift from a northerly direction to a northeasterly direction in the vicinity of Armstrong Corner Road, and would continue in a northeasterly direction, cross over existing US 301 approximately 3,000 feet north of Marl Pit Road. The alignment would then cross over the Norfolk Southern rail line and Boyds Corner Road (SR 896).

b. Boyds Corner Road to SR 1

After crossing to the north side of Boyds Corner Road, the Purple Alternative extends to the east, parallel to SR 896 (Boyds Corner Road). In this location, the Purple and Yellow Alternatives share a common alignment. Existing Boyds Corner Road would continue to provide local access. The new US 301 would cross over Jamison Corner Road, Emerson Road, Shallcross Lake Road, US 13 and SR 1 and tie into SR 1, north of the SR 1/Boyds Corner Road interchange and south of the existing Biddles Corner Toll Plaza. Directional ramps from southbound SR 1 to southbound US 301 and from northbound US 301 to northbound SR 1 would bypass the SR 1 Biddles Corner Toll Plaza.

c. Armstrong Corner Road Area to Summit Bridge - Spur Road

The Purple Alternative Spur Road would extend from the new US 301 mainline in the vicinity of Armstrong Corner Road and continue on the ridge alignment, between Choptank Road and existing US 301, to just south of the Summit Bridge. The existing US 301/SR 896/SR 15 intersection would be replaced with an interchange. Old Schoolhouse Road and Churchtown Road would overpass the Spur Road (no access). Bethel Church Road would be extended east from the existing intersection of Bethel Church Road and Choptank Road, and would interchange with the Spur Road (partial cloverleaf providing access to and from the north).

4. Brown Alternative

The Brown Alternative would be constructed on new location along the ridge route, generally north and south, from the Delaware/Maryland state line to south of Summit Bridge. It would then continue on a new easterly alignment to intersect with SR 1 north of the Biddles Corner Toll Plaza and south of the SR 1 bridge over the C&D Canal. The alignment of the Brown Alternative would be identical to the Purple Alternative from the state line to just south of Armstrong Corner Road, where it would continue north on the ridge alignment to north of Churchtown Road (similar to the Spur Road alignment for the Purple and Green Alternatives). At that point, the Brown Alternative provides two options for the east-west segment of the new alignment, the North Option and the South Option.

The Brown Alternative North and South options measure a total length of 15.5 and 15.9 miles, respectively, and have five interchanges. Both have a diamond interchange southwest of Middletown at Levels Road; directional ramps and a half diamond interchange at SR 15/SR 896 south of Summit Bridge; a diamond interchange at Jamison Corner Road; and flyover ramps to SR 1 north of the Biddles Corner Toll Plaza. The North Option has an additional diamond interchange at SR 896 east of Summit Airpark, and the South Option includes a partial cloverleaf at SR 896 east of Summit Airpark. The Brown Alternative with North and South Options is shown in ***Appendix A*** and in detail on ***Brown Alternative, Sheets 1 through 6 in Appendix B***.

a. State Line to North of Churchtown Road

This portion of the Brown Alternative would be identical to the Purple Alternative until just south of Armstrong Corner Road, where the Brown Alternative would continue north on the ridge route until north of Churchtown Road.

b. North of Churchtown Road to SR 1 – North Option

Just north of Churchtown Road, the Brown Alternative North Option would continue in a northerly direction towards the existing SR 15/SR 896 intersection south of Summit Bridge. The North alignment would then continue east/west on a new alignment toward SR 1, passing between the communities of Summit Bridge Farms and Lea Eara Farms. The North Alignment would cross over the Norfolk Southern rail line and under both a reconstructed Ratledge Road and a reconstructed Jamison Corner Road, pass south of the Airmont community, cross over Scott Run and under a reconstructed Hyetts Corner Road, and continue east to an interchange with SR 1 north of the existing Biddles Corner Toll Plaza and south of the SR 1 bridge over the C&D Canal. Directional ramps would be provided from southbound SR 1 to southbound US 301 and from northbound US 301 to northbound SR 1.

c. North of Churchtown Road to SR 1 – South Option

Just north of Churchtown Road, the Brown Alternative South Option alignment would turn northeast between the communities of Chesapeake Meadow and Summit Bridge Farms. The

alignment would pass through the Summit Airport and cross over SR 896 and the Norfolk Southern Rail Line. The alignment would then extend to SR 1 on the same alignment as the Brown North Option from east of Ratledge Road.

5. Green Alternative

The Green Alternative would be constructed on new location along the ridge route, generally northward, from the Delaware/Maryland state line to north of Middletown near Armstrong Corner Road, where the alignment would then continue northeast to cross over existing SR 896 (Boyds Corner Road), and tie into SR 1 north of the Biddles Corner Toll Plaza. Near Armstrong Corner Road, where the alignment extends to the northeast, a two-lane, limited access Spur Road would continue north on new location along the ridge route to intersect SR 15/SR 896 south of Summit Bridge and the C & D Canal. Just south of Boyds Corner Road, the Green Alternative provides two options for the eastern segment of the new alignment, the North Option and the South Option.

The Green Alternative North and South Options measure a total length of 17.5 and 17.3 miles, respectively, including the Spur Road, and have six interchanges: a diamond interchange southwest of Middletown at Levels Road; right-on/right-off ramps at existing US 301 in the vicinity of Armstrong Corner Road; a diamond interchange at Jamison Corner Road; flyover ramps to SR 1 north of the Biddles Corner Toll Plaza; a partial cloverleaf interchange along the Spur Road at an extended Bethel Church Road; and a flyover ramp at the terminus of the Spur Road at the SR 15/SR 896 junction. The Green Alternative with North and South Options is shown in ***Appendix A*** and in detail on ***Green Alternative, Sheets 1 through 6, in Appendix B***.

a. State Line to Armstrong Corner Road Area

The alignment of the Green Alternative would be identical to the Purple Alternative for this portion of the roadway.

b. Mount Pleasant to SR 1 - North Option

East of the Norfolk Southern Railroad overpass, the Green Alternative North Option alignment would continue in a northeast direction to pass over SR 896 (Boyds Corner Road). North of Boyds Corner Road, the North Option would continue in a northerly direction before turning almost directly east toward SR 1. The new US 301 alignment would pass under a reconstructed Jamison Corner Road, pass south of the Airmont community, cross over Scott Run and under Hyetts Corner Road, and continue east to interchange with SR 1 north of the existing Biddles Corner Toll Plaza and south of the SR 1 bridge over the C&D Canal. Directional ramps would be provided from southbound SR 1 to southbound US 301 and from northbound US 301 to northbound SR 1.

c. Mount Pleasant to SR 1 - South Option

East of the Norfolk Southern Railroad overpass, the Green Alternative South Option alignment would continue in a northeasterly direction to pass over SR 896 (Boyds Corner Road). North of Boyds Corner Road, the South Option would continue on new location in a northeasterly direction toward SR 1, passing over Jamison Corner Road. The alignment would then cross over Scott Run and under a reconstructed Hyetts Corner Road, continuing on the same alignment as the North Option from east of Hyetts Corner Road.

d. Armstrong Corner Road Area to Summit Bridge - Spur Road

The alignment of the Green Alternative Spur Road would be identical to the Purple Alternative Spur Road for this portion of the roadway.

6. Comparison of Engineering Features

Each of the Alternatives Retained for Detailed Evaluation is compared on the basis of its engineering features and on its ability to meet the project's Purpose and Need. A comparison of the engineering and design features and estimated costs is summarized in ***Table II-1***.

All of the retained alternatives meet the project's Purpose and Need to varying degrees with respect to relieving congestion, separating through traffic from local traffic, and improving safety. All of the alternatives would provide comparable or improved levels of service in the design year (2030) as compared to the No-Build. The Yellow Alternative, including the frontage roads, is the longest, measuring 19.4 miles. The Brown Alternative South Option is the shortest at 16.9 miles. The Yellow Alternative has four access points, the Purple and Brown Alternatives have five access points, and the Green Alternative has six access points. The Yellow Alternative and the Purple Alternative require the most overpass structures (11) for roads and the Norfolk Southern Railroad. The Yellow Alternative would be the most costly to construct.

Table II-1: Comparison of Engineering Features and Costs

Alternative	Yellow	Purple	Brown North Option	Brown South Option	Green North Option	Green South Option
Alignment Description	On alignment US 301 plus E/W SR 896	Ridge route plus on alignment E/W SR 896 (with spur)	Ridge route plus new northern E/W alignment	Ridge route plus new northern E/W alignment	Ridge route plus new E/W alignment (with spur)	Ridge route plus new E/W alignment (with spur)
Alignment Length, miles	19.4	16.9	17.5	15.9	17.5	17.3
Total Area of LOD, acres	870	902	896	894	897	876
Number of Properties Impacted	301	164	114	121	142	139
# of Interchanges	4	5	5	5	6	6
Interchange Locations	• Levels Road • 301 north of Middletown • SR1at Boyds Corner Rd • SR 15/SR 896	• Levels Road • Armstrong Corner Rd • SR1at Boyds Corner Rd • Bethel Church Road • SR 15/SR 896	• Levels Road • SR896/Summit Bridge • SR896/Summit Airpark • Jamisons Corner Road • SR1 north of Toll Plaza	• Levels Road • SR896/Summit Bridge • SR896/Summit Airpark • Jamisons Corner Rd • SR1 north of Toll Plaza	• Levels Road • Armstrong Corner Rd • Jamisons Corner Rd • SR1 north of Toll Plaza • Bethel Church Road • SR 15/SR 896	• Levels Road • Armstrong Corner Rd • Jamisons Corner Rd • SR1 north of Toll Plaza • Bethel Church Road • SR 15/SR 896
# Overpasses/ Underpasses	11	11	8	8	9	9
Over/Underpass Locations	• Strawberry Lane • Middletown B&T Park • Bunker Hill Rd • Broad Street • Marl Pit Road • US 301 • Norfolk Southern RR • SR 896 • Jamisons Corner Road • SR 896 • Shallcross Lake Road	• Strawberry Lane • Bunker Hill Road • Armstrong Corner Road • US 301 • Norfolk Southern RR • SR 896 • Jamisons Corner Road • SR 896 • Shallcross Lake Road • Old Schoolhouse Road • Churchtown Road	• Strawberry Lane • Bunker Hill Road • Bohemia Mill Road • Old Schoolhouse Rd • Churchtown Road • Norfolk Southern RR • Ratledge Road • Hyetts Corner Rd	• Strawberry Lane • Bunker Hill Road • Bohemia Mill Road • Old Schoolhouse Rd • Churchtown Road • Norfolk Southern RR • Ratledge Road • Hyetts Corner Rd	• Strawberry Lane • Bunker Hill Road • Armstrong Corner Road • US 301 • Norfolk Southern RR • SR 896 • Hyetts Corner Rd • Old Schoolhouse Road • Churchtown Road	• Strawberry Lane • Bunker Hill Road • Armstrong Corner Road • US 301 • Norfolk Southern RR • SR 896 • Hyetts Corner Rd • Old Schoolhouse Road • Churchtown Road
Preliminary Cost ($ millions)	$686 - $758	$616 - $680	$550 - $608	$499 - $551	$534 - $590	$526 - $582

D. Alignment Options Considered

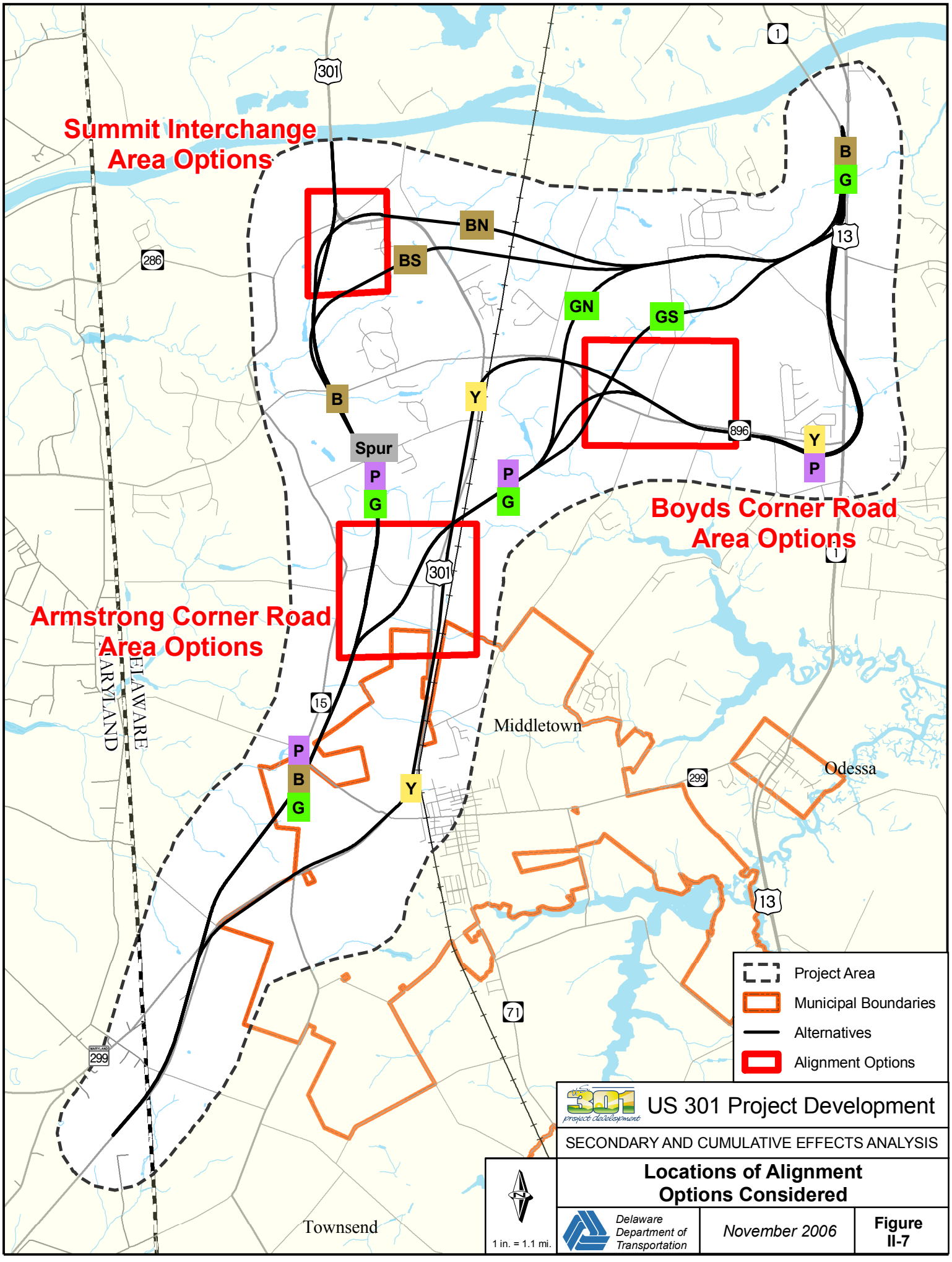
Following the presentation of the Alternatives Retained for Detailed Evaluation to the environmental resource and regulatory agencies on November 8, 2005, the alternatives, in response to Agency and public comments, underwent further evaluation and options development to avoid or minimize potential impacts. These options were presented to the public at workshops in December 2005, February 2006, and April 2006. Options for the alternatives were developed in three major locations: the Armstrong Corner Road Area (ACR Area); the Boyds Corner Road Area (BCR Area); and on the Spur Road at the intersection of SR 15/SR 896, the Summit Interchange Area (SI Area). The location of the options is shown in ***Figure II-7.*** The options are shown in ***Appendix C, Figures 1-15,*** listed on ***Table II-2*** and described in the following sections. A comparison of environmental impacts, advantages and disadvantages of the options is presented in ***Tables II-3*** through ***II-6***. The preferred option has been incorporated into the alternatives as shown on the sheets in ***Appendix B***.

Table II-2: Alternatives Options Considered

Figure #'s	Options	Yellow Alternative	Purple Alternative	Brown Alternative North Option	Brown Alternative South Option	Green Alternative North Option	Green Alternative South Option
1 - 4	Interchange Options in the Armstrong Corner Road Area **ACR Area Options**	N/A	Option 1 Option 2 Option 2A Option 3	N/A	N/A	Option 1 Option 2 Option 2A Option 3	Option 1 Option 2 Option 2A Option 3
5 - 8	Optional Alignments in the Boyds Corner Road Area **BCR Area Options**	Option 1 Option 2 Option 3 Option 4	Option 1 Option 2 Option 3 Option 4	N/A	N/A	N/A	N/A
9 - 15	Interchange Options and Spur Road access at SR 15/SR 896 **SI Area Options**	Option 1 Option 2	Option 1 Option 2 Option 3 Option 3B Option 4	N/A	N/A	Option 1 Option 2 Option 3 Option 3B Option 4	Option 1 Option 2 Option 3 Option 3B Option 4

1. <u>Armstrong Corner Road (ACR) Area Options –Purple and Green Alternatives</u>

Four interchange options were considered for the Purple and Green Alternatives in the Armstrong Corner Road (ACR) area. In this location, the new US 301 mainline leaves the ridge route and travels northeast towards the Norfolk Southern rail line. The Spur Road leaves the new US 301 mainline and continues north along the ridge route towards the Summit Bridge. An interchange is provided in the Armstrong Corner Road area on the new US 301 mainline to access the areas north of Middletown. The options were developed in an attempt to minimize or avoid impacts to community facilities and other properties located in this area.


Summit Interchange Area Options
Boyds Corner Road Area Options
Armstrong Corner Road Area Options
BN
BS
GN
GS
B
G
Y
P
Spur
301
286
1
13
896
15
299
71
Middletown
Odessa
Townsend
MARYLAND
DELAWARE
Project Area
Municipal Boundaries
Alternatives
Alignment Options
US 301 Project Development
SECONDARY AND CUMULATIVE EFFECTS ANALYSIS
Locations of Alignment Options Considered
1 in. = 1.1 mi.
Delaware Department of Transportation
November 2006
Figure II-7

Each of the ACR Area options is described in the sections below. The potential impacts of each option are compared in ***Table II-3.*** The ACR Area Options are shown in ***Appendix C, Figures 1-4.*** The preferred option is also shown on the Purple and Green Alternatives drawings in ***Appendix B***.

a. ACR Area Option 1

ACR Area Option 1 would provide a diamond interchange between the new US 301 and Armstrong Corner Road east of Choptank Road. Interchange ramps would provide local access on Armstrong Corner Road, west of existing US 301. A programmed traffic signal would be provided at the intersection of existing US 301 and Armstrong Corner Road. Armstrong Corner Road would overpass both the new US 301 mainline and spur road.

b. ACR Area Option 2

ACR Area Option 2 would provide a diamond interchange between new US 301 and a relocated existing US 301. Existing US 301 would be relocated to the west, beginning at Armstrong Corner Road and extending to just south of Post and Rail Farms to rejoin the existing US 301 alignment. Armstrong Corner Road would be realigned to overpass the Spur Road. New US 301 would overpass Armstrong Corner Road south of the diamond interchange. Signalized intersections with the realigned existing US 301 would provide ramp access.

c. ACR Area Option 2A

ACR Area Option 2A would provide right-on/right-off ramps between new and existing US 301. The northbound entrance and exit ramps would be located on existing US 301 approximately 1,000 feet north of Armstrong Corner Road. The southbound entrance and exit ramps would be located on existing US 301, approximately 3,500 feet north of Armstrong Corner Road. Two new signalized intersections on existing US 301 would control exit and entry traffic.

d. ACR Area Option 3

ACR Area Option 3 would provide a diamond interchange between the new US 301 and Armstrong Corner Road similar to Option 1; however, the mainline would leave the ridge alignment and travel to in a northeasterly direction approximately 2,200 feet south of the directional change for Option 1. Interchange ramps would provide local access on Armstrong Corner Road, west of existing US 301, and a signal would be provided on existing US 301 at Armstrong Corner Road. Armstrong Corner Road would overpass both the mainline and spur road.

Table II-3: Purple and Green Alternatives
Impacts Comparison of the Armstrong Corner Road Area Options

Option	1	2	2A	3
Total Length of Option (miles)	4.0	3.9	3.9	3.9
Total area of Limit of Construction (acres)	218	301	226	200
Wetlands (acres)[1]	7.6	9.2	10.0	11.7
High quality (acres)	0.8	2.3	0.8	1.4
Medium quality (acres)	5.3	6.3	8.7	9.7
Low quality (acres)	1.6	0.6	0.6	0.6
Waters of the US (lf)[2]	2,867	3,020	2,955	1,816
Hydric Soils (acres)[3]	39	53	52	47
DNREC Sub-Aqueous Lands (linear feet)	853	1,676	1,630	853
Habitat Areas (Wildlife & Plant) (acres)	26.9	23.8	24.3	23.2
Prime Farmland Soils (acres)	134	153	136	120
Ten-year Agricultural Preservation Easements (#)	1 (10.0 ac.)	1 (10.3 ac.)	1 (9.9 ac.)	1 (10.0 ac.)
Permanent Agricultural Preservation Easements (#)	0	0	0	0
Forested Land (acres)[4]	15.7	12.0	9.9	10.6
Historic Properties Direct Impacts	0	0	0	0
Historic Properties Potential Indirect Impacts[5]	1 (V,A)	2 (V,A)	2 (V,A)	(2 (V,A)

Notes
1. *Total area of ACOE wetlands impacted.*
2. *Does not include waters within wetlands. lf = linear feet*
3. *Includes hydric soils not in wetlands.*
4. *Includes deciduous, evergreen and mixed forest types not included in wetlands. Based on DE Department of Land Use & Planning 2002 Land Use data.*
5. *Potential visual (V) and/or audible (A) impacts.*

2. Boyds Corner Road (BCR) Area Options – Yellow and Purple Alternatives

Four mainline options were considered for the Yellow and Purple Alternatives that would minimize or avoid impacts to community facilities located at the corner of SR 896 (Boyds Corner Road) and Jamison Corner Road, active farmland (Emerson Dairy Farm), and the planned Bayberry Town Center/Village of Bayberry. The options explored various alignments of the segment of new US 301 from Mount Pleasant to SR 1.

Each of the Boyds Corner Road Area options is described in the sections below. The potential impacts of each option are compared in ***Table II-4***. The BCR Area options are shown in ***Appendix C, Figures 5-8***. The preferred option is also shown on the Yellow and Purple Alternative drawings in ***Appendix B.***

a. BCR Area Option 1

The BCR Area Option 1 mainline alignment is the most closely aligned to the existing SR 896 (Boyds Corner Road), leaving minimal space between the mainline and existing SR 896. Option 1 would cross to the north of SR 896, just west of Cedar Lane Road and be less than 300 feet north of SR 896 at Jamison Corner Road. The Option 1 alignment would remain on the north side of existing SR 896 to just east of Jamison Corner Road, where the alignment would

cross over SR 896 and follow on the south side of existing Boyds Corner Road to cross over Shallcross Lake Road, US 13, and SR 1 and tie into SR 1.

b. BCR Area Option 2

The BCR Area Option 2 mainline alignment would overpass SR 896 (Boyds Corner Road) west of Cedar Lane Road. Option 2 would continue northeast and cross Jamison Corner Road approximately 2,200 feet north SR 896 along the southern side of the Emerson Dairy Farm parcel. Option 2 would continue east through the Emerson Farm parcel and then turn towards the south to cross over Milford Drive and SR 896, where it would continue on the south side and parallel to existing SR 896, crossing over US 13 and SR 1 before tying into SR 1.

c. BCR Area Option 3

The BCR Area Option 3 mainline would overpass Boyds Corner Road west of Cedar Lane Road, then cross over Jamison Corner Road approximately 1,500 feet north of SR 896. The Option 3 alignment would traverse the northwest corner of the proposed Bayberry Town Center property and the southeast corner of the Emerson Dairy Farm, continuing east through the Bayberry Town Center property, and then turn towards the south to cross over Milford Drive and SR 896, where it would continue on the south side of and parallel to existing SR 896, crossing over US 13 and SR 1 before tying into SR 1.

d. BCR Area Option 4

The BCR Area Option 4 mainline alignment would overpass Boyds Corner Road, then cross over Jamison Corner Road approximately 750 feet north of SR 896. The Option 4 alignment would traverse the southwest corner of the proposed Bayberry Town Center property prior to crossing over SR 896 to the south side approximately 2,400 feet east of Jamison Corner Road. The alignment would cross over Shallcross Lake Road, US 13 and SR 1 before tying into SR 1.

Table II-4: Yellow and Purple Alternatives
Impacts Comparison of the Boyds Corner Road Area Options

Option		1	2	3	4
Total Length of Option (miles)	Yellow Alternative	3.4	3.5	3.5	3.5
	Purple Alternative	4.0	4.2	4.2	4.1
Total area of Limit of Construction (acres)	Yellow Alternative	156	159	155	143
	Purple Alternative	184	173	169	163
Wetlands (acres)[1]	Yellow Alternative	9.3	8.7	11.7	12.5
	Purple Alternative	5.5	3.7	3.7	4.3
Waters of the US (lf)[2]	Yellow Alternative	3,523	2,709	1,809	3,307
	Purple Alternative	1,556	1,799	1,371	1,282
Hydric Soils (acres)[3]	Yellow Alternative	22	44	27	25
	Purple Alternative	23	30	26	21
DNREC Sub-Aqueous Lands (linear feet)	Yellow Alternative	88	710	879	1,398
	Purple Alternative	552	1,577	723	552
HabitatAreas (acres) (Wildlife & Plant)	Yellow Alternative	7.9	4.2	7.3	5.7
	Purple Alternative	7.8	9.7	7.4	7.5
Prime Farmland Soils (acres)	Yellow Alternative	39	44	39	35
	Purple Alternative	38	34	34	37
Ten-year Agricultural Preservation Easements (#)		0	0	0	0
Permanent Agricultural Preservation Easements (#)		0	0	0	0
Forested Land (acres)[4]	Yellow Alternative	4.2	6.8	3.6	4.1
	Purple Alternative	9.0	6.6	6.6	8.3
Historic Properties Direct Impacts[5]		0	0	0	0
Historic Properties Potential Indirect Impacts[6]	Yellow Alternative[5]	3 (V,A)	3 (V,A)	3 (V,A)	3 (V,A)
	Purple Alternative	1 (V,A)	1 (V,A)	1 (V,A)	1 (V,A)

NOTES: 1. Total area of ACOE wetlands impacted.
2. Does not include waters within wetlands. lf = linear feet
3. Includes hydric soils not in wetlands.
4. Includes deciduous, evergreen and mixed forest types not included in wetlands. Based on DE Department of Land Use & Planning 2002 Land Use data.
5. There would be audible and visual impacts to the remainder of Mt. Pleasant Farm, the resource directly impacted.
6. Potential visual (V) and/or audible (A) impacts.

3. Summit Interchange (SI) Area Options – Yellow, Purple and Green Alternatives

Two interchange options were considered for the Yellow Alternative at the SR 15/SR 896 intersection at the base of Summit Bridge to address safety and traffic issues. Five interchange options were also considered for the Purple and Green Alternatives at this location to address safety and traffic operations. The Brown Alternative North and South Options include an interchange to serve traffic and address safety at this location. No additional options were considered for the Brown Alternative.

The SI Area Options are described in the sections below. The potential impacts of each option are compared in ***Tables II-5 and II-6.*** The SI Area Options are shown in ***Appendix C, Figures 9-17.*** The preferred options are also shown on the Yellow, Purple, and Green Alternatives drawings in ***Appendix B***.

a. SI Area Option 1 – Yellow Alternative

SI Area Option 1 for the Yellow Alternative would provide a partial cloverleaf interchange in the present location of the SR 15/SR 896 intersection at the base of Summit Bridge. The interchange would include a loop ramp for traffic traveling southbound from Summit Bridge to SR 896 eastbound. Directional ramps would provide for the balance of the movements in the interchange.

b. SI Area Option 2 – Yellow Alternative

SI Area Option 2 for the Yellow Alternative would include a grade-separated interchange in the present location of the SR 15/SR 896 intersection at the base of Summit Bridge. The interchange would provide an at-grade through movement for vehicles traveling to/from SR 896 and the Summit Bridge by improving the existing curve. Access between SR 15 and SR 896 to/from Middletown would pass over the improved curve. A directional ramp would connect the Summit Bridge to southbound SR 15.

Table II-5: Yellow Alternative
Impacts Comparison of the Summit Interchange Area Options

Option	1	2
Total area of Limit of Construction (acres)	49	28
Wetlands (acres)[1]	4.3	0.4
Waters of the US (ditches) (lf)[2]	2,260	1,271
Hydric Soils (acres)[3]	53	4
DNREC Sub-Aqueous Lands (linear feet)	393	0
Habitat Areas (Wildlife & Plant) (acres)	5.3	1.9
Prime Farmland Soils (acres)	17	12
Forested Land (acres)[4]	0.5	0.1
Historic Properties Direct Impacts	0	0
Historic Properties Potential Indirect Impacts[5]	0	0

NOTES:
1. *Total area of ACOE wetlands impacted.*
2. *Does not include waters within wetlands. lf = linear feet*
3. *Includes hydric soils not in wetlands.*
4. *Includes deciduous, evergreen and mixed forest types not included in wetlands. Based on DE Department of Land Use & Planning 2002 Land Use data.*
5. *Potential visual (V) and/or audible (A) impacts.*

c. SI Area Option 1 – Purple and Green Alternatives

SI Area Option 1 would provide a full diamond interchange at the intersection of SR 15, SR 896, and the Spur Road, with free traffic flow between the Spur Road and the Summit Bridge. The ramp termini would be signalized.

d. SI Area Option 2 - Purple and Green Alternatives

SI Area Option 2 would provide a directional "Y" interchange between SR 896 and the US 301 Spur Road. Option 2 would improve the sharp curve (the direct movement) on SR 896 to the desired design speed and provide a continuous traffic flow for the major movements on SR 896. The northbound Spur Road would pass over SR 896. SR 15 would pass over both SR 896 and the Spur Road to intersect with Old Summit Bridge Road, east of the interchange. Access to SR 896 would be provided at the existing signalized intersection of Old Summit Bridge Road and SR 896. A sub-option, Option 2A, would relocate the existing traffic signal at Old Summit Bridge Road to the entrance to Summit Bridge Farms, and Old Summit Bridge Road would be extended to this location. This would provide a two-directional signalized entrance for Summit Bridge Farms (existing entrance is right-in/right-out only).

e. SI Area Option 3 – Purple and Green Alternatives

SI Area Option 3 would provide a directional "Y" interchange between SR 896 and the US 301 Spur Road, similar to SI Area Option 2. However, Option 3 would include a cul-de-sac on Bethel Church Road both east and west of the interchange. Access from Choptank Road and Bethel Church Road to the Spur Road would be provided via a new signalized intersection between an extended Bethel Church Road and the Spur Road. As with SI Area Option 2, access to SR 896 from the communities to the north (Lea Eara Farms and Summit Bridge) would be provided at the existing signalized intersection of Old Summit Bridge Road and SR 896. SI Area Option 3A, similar to Option 2A, would relocate the existing traffic signal at Old Summit Bridge Road to the entrance to Summit Bridge Farms.

f. SI Area Option 3B - Purple and Green Alternatives

SI Area Option 3B would provide the same roadways and interchange ramps as Option 3, but would replace the signalized intersection at Bethel Church Road extended with a partial cloverleaf interchange. The interchange would provide access to and from the north only. SI Area Option 3BA, similar to Option 2A and 3A, would relocate the existing traffic signal at Old Summit Bridge Road to the entrance to Summit Bridge Farms.

g. SI Area Option 4 – Purple and Green Alternatives

SI Area Option 4 would provide the same interchange as Option 3; however, access to the Spur Road at Churchtown Road and Old Schoolhouse Road would be included. Traffic signals would be provided at the three intersections on the Spur Road. SI Area Sub-Option 4A, similar to Option 2A and 3A, would relocate the existing traffic signal at Old Summit Bridge Road to the entrance to Summit Bridge Farms.

Table II-6: Purple and Green Alternatives
Impacts Comparison of the Summit Interchange Area Options

Option	1	2	3	3B	4
Total Length of Option (miles)	2.0	2.9	2.9	2.9	2.9
Total area of Limit of Construction (acres)	142	145	143	145	117
Wetlands (acres)[1]	5.0	7.0	7.0	7.0	6.3
Waters of the US (lf)[2]	4,396	4,374	4,106	4,130	2,511
Streams (lf)	260	260	260	260	0
Ditches (lf)	4,136	4,114	3,846	3,870	2,511
Hydric Soils (acres)[3]	30	31	32	32	25
DNREC Sub-Aqueous Lands (linear feet)	1,509	1,490	1,621	1,643	777
Habitat Areas (Wildlife & Plant) (acres)	11.1	12.9	12.8	12.8	12.3
Prime Farmland Soils (acres)	71	70	74	79	63
Ten-year Agricultural Preservation Easements (#)	0	0	0	0	0
Permanent Agricultural Preservation Easements (#)	1 (6.1 ac.)	1 (6.1 ac.)	1 (6.1 ac.)	1 (6.1 ac.)	1 (6.1 ac.)
Forested Land (acres)[4]	6.1	6.0	5.9	5.9	5.0
Historic Properties Direct Impacts	0	0	0	0	0
Historic Properties Potential Indirect Impacts[5]	0	0	0	0	0

NOTES: 1. Total area of ACOE wetlands impacted.
2. Does not include waters within wetlands. lf = linear feet
3. Includes hydric soils not in wetlands.
4. Includes deciduous, evergreen and mixed forest types not included in wetlands. Based on DE Department of Land Use & Planning 2002 Land Use data.
5. Potential visual (V) and/or audible (A) impacts.